

METHODS AND SYSTEMS FOR
GENERATING PHASE-DERIVATIVE SOUND
ABSTRACT OF THE DISCLOSURE

Methods and systems for digitally generating sound from phase and amplitude information of a narrow bandwidth signal, such as a narrow bandwidth locator signal. Phase-derivative information is determined from the phase information. The bandwidth of the phase-derivative information is spread out, or stretched, over a wider bandwidth, so that the frequency variations will be more perceptible to users.. The result is combined with an audio band carrier frequency, the result of which controls an oscillator. The oscillator output is combined with the amplitude information to generate an analog audio signal that is modulated with the amplitude information and the phase-derivative information. The amplitude information wider bandwidth phase-derivative information are used to modulate an audio carrier in both frequency and amplitude. The overall process can be thought of as a translation of the frequency and amplitude information from the narrow bandwidth around the locate frequency to a wider bandwidth on a chosen carrier frequency in the audio band. The received amplitude and phase information is received at an input sample rate. Where the input sample rate is relatively low, the amplitude and phase information are up-sampled to an output sample rate that is higher than a desired audio frequency. The higher output sample rate insures that there are sufficient samples of the signal during each cycle or period of the audio frequency. The higher sample rate is typically also the sample rate of a digital to analog converter that outputs an analog signal to a speaker. The amplitude information and/or phase derivative information are optionally scaled to system gain. The sound heard by the operator can optionally be adjusted with an optional selectivity filter.

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